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The Connecticut Agricultural Experiment Station.

NEW HAVEN, CONN.

BULLETIN No. 90.

MARCH, 1887.

NOTICE.

Parties wishing to send samples for analysis should apply before doing so to the Station for its Instructions for Sampling and Terms on which such analyses are undertaken.

The Bulletins of this Station will be sent without further special request to those periodicals and public institutions which have received them hitherto. They will also be mailed to citizens of Connecticut who send their names and addresses to the Station for that purpose. Such applications should be annually renewed as new mailing lists are prepared at the beginning of each year.

Citizens of other States may receive the Bulletins together with the Annual Report by remitting fifty cents to cover cost of mailing, etc. Such orders should be sent in early in the year.

As required by law, a package of each Bulletin is mailed to every post-office in the State. The package is directed to the Postmaster, with a request to distribute to farmers. The number sent will be increased in any case on application.

VALUATION OF FERTILIZERS.

EXPLANATIONS.

The average *Trade-values* or cost per pound, of the ordinarily occurring forms of nitrogen, phosphoric acid and potash, as found in the large markets of New England, New York and New Jersey, are as follows :

These *Trade-values*, except those for phosphoric acid soluble in ammonium citrate, were agreed upon by the Experiment Stations of Connecticut, New Jersey and Massachusetts for use in their several States during 1887.

TRADE VALUES OF FERTILIZING INGREDIENTS IN RAW MATERIALS AND CHEMICALS FOR 1887.

	Cents per lb.
Nitrogen in ammonia salts	17½
" nitrates	16
Organic nitrogen in dried and fine ground fish	17½
" " azotin, ammonite and dry ground meat	17½
" " castor pomace	17½
" " dried and fine ground blood	16½
" " fine ground bone and tankage	16
" " fine-medium bone and tankage	14
" " medium bone and tankage	12
" " coarse-medium bone and tankage	10
" " coarse bone and tankage, horn shavings, hair and fish scrap	8
Phosphoric acid, soluble in water	8
" " soluble in ammonium citrate *	7½
" " in dry ground fish	7
" " in fine bone and tankage	7
" " in fine-medium bone and tankage	6
" " in medium bone and tankage	5
" " in coarse-medium bone and tankage	4
" " in coarse bone and tankage	3
" " in fine ground rock phosphate	2
Potash as high grade sulphate and in forms free from muriate (or chlorides)	5½
" as kainit	4½
" as muriate	4½

The above *Trade-values* are the figures at which in March the respective ingredients could be bought at retail for cash, in our large markets, in the *raw materials* which are the regular source

* Dissolved from 2 grams of the unground phosphate previously extracted with pure water, by 100 c. c. neutral solution of Ammonium Citrate, sp. gr. 1.09, in 30 minutes, at 65° C., with agitation once in five minutes. Commonly called "reverted" or "backgone" Phosphoric Acid.

of supply. They also correspond to the average wholesale prices for the six months ending March 1st, plus about 20 per cent. in case of goods for which we have wholesale quotations. The valuations obtained by use of the above figures will be found to agree fairly with the *reasonable retail price* at the large markets of standard raw materials such as:—

Sulphate of Ammonia,	Azotin,
Nitrate of Soda,	Dry Ground Fish,
Muriate of Potash,	Ammonite,
Sulphate of Potash,	Castor Pomace,
Dried Blood,	Bone and Tankage,
Plain Superphosphate,	Ground So. Carolina Rock.

TRADE VALUES IN SUPERPHOSPHATES, SPECIAL MANURES AND MIXED FERTILIZERS OF HIGH GRADE.

The Organic Nitrogen in these classes of goods is reckoned at the highest figure laid down in the Trade-values of Fertilizing Ingredients in Raw Materials, namely, $17\frac{1}{2}$ cents per pound, it being assumed that the organic nitrogen is derived from the best sources, viz: bone, tankage, blood, fish, castor pomace, or other equally good forms, and not from leather, shoddy, hair or any low-priced inferior forms of vegetable matter, unless the contrary is ascertained.

Insoluble Phosphoric acid is reckoned at 3 cents, it being assumed, unless found otherwise, that it is from bone or similar source and not from rock phosphate. In this latter form the insoluble phosphoric acid is worth but 2 cents per pound. Potash is rated at $4\frac{1}{4}$ cents, if sufficient chlorine is present in the fertilizer to combine with it to make muriate. If there is more Potash present than will combine with the chlorine, then this excess of Potash is reckoned at $5\frac{1}{2}$ cents.

In most cases the valuation of the Ingredients in Superphosphates and Specials falls below the retail price of these goods. The difference between the two figures, represents the manufacturer's charges for converting raw materials into manufactured articles. These charges are for grinding and mixing, bagging or barreling, storage and transportation, commission to agents and dealers, long credits, interest on investment, bad debts, and finally, profits.

The majority of reputable manufacturers agree that the average cost of mixing, bagging, handling and cartage ranges from \$3.00 to \$4.50 per ton.

In 1886 the average selling price of Ammoniated Superphosphates and Guanos was \$36.58, the average valuation was \$29.42, and the difference \$7.16—an advance of 24.3 per cent. on the valuation and on the wholesale cost of the fertilizing elements in the raw materials.

In case of Specials the average cost was \$42.56, the average valuation \$36.70, and the difference \$5.86 or 16.0 per cent. advance on the valuation.

To obtain the Valuation of a Fertilizer (i. e. the money-worth of its fertilizing ingredients), we multiply the pounds per ton of Nitrogen, etc., by the trade-value per pound. We thus get the values per ton of the several ingredients, and adding them together we obtain the total valuation per ton.

Further explanations may be found in the Annual Report.

FERTILIZER ANALYSES.

ASHES.

1886. "Corn Cob Ashes." Sampled and sent by W. W. Pease, Thompsonville.

1897. Unleached Hard Wood Ashes. Sample drawn from a car-load of 15 tons, purchased of James Hartness, Detroit, Mich. Sent by W. H. Burr, Westport.

1896. Cotton Seed Hull Ashes. Sampled by Dwight S. Fuller, Suffield, from car-load received by him from the south.

1899. Cotton Hull Ashes. Sample drawn by Edmund Halladay, Suffield, from four packages in stock of F. S. Harmon, agent for F. Ellsworth, Hartford.

ANALYSES AND VALUATIONS.

	1886.	1897.	1896.	1899.
Potash soluble in water.....	12.87	5.34	18.97	32.79
Phosphoric Acid, soluble			1.57	.91
" " "reverted".....	2.26	1.66	7.63	4.00
" " "insoluble.....			1.42	.09
Sand, soil and coal.....	34.65	15.40		
Moisture.....		10.84		
Cost per ton.....	\$25.00	\$11.00		\$33.00
Valuation per ton.....	\$17.32	8.09	35.39	43.57

Potash is valued in ashes at $5\frac{1}{2}$ cents per pound, being in other forms than muriate, and phosphoric acid at the same figure as in

superphosphates when it is determined in the three states. In wood ashes which contain relatively little phosphoric acid it is valued at 7 cents per pound.

The *valuation* of ashes, which is based only on the quantities of potash and phosphoric acid which they contain, falls very considerably below the market price. The *agricultural value* of ashes, however, consists not wholly, oftentimes not at all in the quantity of potash and phosphoric acid in them, but in their favorable effect on the mechanical condition of the soil, or in their serving as a source of lime to the crop.

POTASH SALTS.

1890. Muriate of Potash.

1892. "Sulphate of Potash." Double Sulphate of Potash and Magnesia, also called "Double Manure Salt."

Each of the above was sampled by a Station agent from every tenth bag in a stock of 50 tons for sale by L. Sanderson, 119 Long Wharf, New Haven.

	1890.	1892.
Potash soluble in water.....	50.88	27.17
Equivalent muriate	80.60	
Equivalent sulphate.....		50.20
Cost per ton.....	\$42.50	\$30.00
Actual potash costs per pound	4.17 cts.	5.52 cts.

DISSOLVED BONE BLACK AND TANKAGE.

1893. Dissolved Bone Black. Stock of 100 tons. Sampled from every tenth bag by Station agents. Stock of L. Sanderson, New Haven.

Analysis.

Soluble Phosphoric Acid.....	15.55
Reverted Phosphoric Acid.....	.10
Insoluble Phosphoric Acid.....	.18
Cost per ton.....	\$26.00
Valuation per ton.....	25.10

BONE AND TANKAGE.

1889. Western Tankage. Stock of 50 tons.

1891. New York Tankage. Stock of 50 tons.

1894. Ground Bone. Stock of 25 tons.

The above samples were drawn by Station agents from every tenth bag in stock of the seller, L. Sanderson, 119 Long Wharf, New Haven.

Mechanical Analyses.

	1889.	1891.	1894.
Fine, smaller than $\frac{1}{64}$ inch	65	75	65 per cent.
Fine medium, smaller than $\frac{1}{32}$ inch	22	14	35 "
Medium, smaller than $\frac{1}{16}$ inch	12	9	0 "
Coarse medium, smaller than $\frac{1}{8}$ inch	1	2	0 "
	100	100	100

Chemical Analyses and Valuations.

	1889.	1891.	1894.
Nitrogen	7.46	5.38	3.86
Phosphoric Acid	12.44	19.24	21.78
Cost per ton	\$38.00	\$38.00	\$35.00
Valuation per ton	38.60	41.87	40.78

S. W. JOHNSON, *Director.*



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